43572

National Library of Canada
Bibliothèque nationale du Canada

Canadian Theses Division
Division des thèses canadiennes

Ottawa, Canada
K1A 0N4

PERMISSION TO MICROFILM — AUTORISATION DE MICROFILMER

• Please print or type — Écrire en lettres moulées ou dactylographier

Full Name of Author — Nom complet de l'auteur

BRENT ALEXANDER TOLMIE

Date of Birth — Date de naissance	Country of Birth — Lieu de naissance
MAY 28 1940	CANADA

Permanent Address — Résidence fixe

RR# 2 VASEUX LAKE
OLIVER B.C.
V0H 1T0

Title of Thesis — Titre de la thèse

A FOLLOW UP STUDY OF GRADUATES OF AN EXPERIMENTAL PROGRAM IN BUILDING CONSTRUCTION.

University — Université

UNIVERSITY OF ALBERTA.

Degree for which thesis was presented — Grade pour lequel cette thèse fut présentée

MASTERS OF EDUCATION

Year this degree conferred — Année d'obtention de ce grade	Name of Supervisor — Nom du directeur de thèse
1979	DR. M. PETRUK

Permission is hereby granted to the NATIONAL LIBRARY OF CANADA to microfilm this thesis and to lend or sell copies of the film.

The author reserves other publication rights, and neither the thesis nor extensive extracts from it may be printed or otherwise reproduced without the author's written permission.

L'autorisation est, par la présente, accordée à la BIBLIOTHÈQUE NATIONALE DU CANADA de microfilmer cette thèse et de prêter ou de vendre des exemplaires du film.

L'auteur se réserve les autres droits de publication; ni la thèse ni de longs extraits de celle-ci ne doivent être imprimés ou autrement reproduits sans l'autorisation écrite de l'auteur.

Date	Signature
sept. 28, 1979	Brent A Tolmie

NL-91 (4/77)

National Library of Canada

Cataloguing Branch
Canadian Theses Division

Ottawa, Canada
K1A 0N4

Bibliothèque nationale du Canada

Direction du catalogage
Division des thèses canadiennes

NOTICE

The quality of this microfiche is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us a poor photocopy.

Previously copyrighted materials (journal articles, published tests, etc.) are not filmed.

Reproduction in full or in part of this film is governed by the Canadian Copyright Act, R.S.C. 1970, c. C-30. Please read the authorization forms which accompany this thesis.

THIS DISSERTATION
HAS BEEN MICROFILMED
EXACTLY AS RECEIVED

AVIS

La qualité de cette microfiche dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de mauvaise qualité.

Les documents qui font déjà l'objet d'un droit d'auteur (articles de revue, examens publiés, etc.) ne sont pas microfilmés.

La reproduction, même partielle, de ce microfilm est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30. Veuillez prendre connaissance des formules d'autorisation qui accompagnent cette thèse.

LA THÈSE A ÉTÉ
MICROFILMÉE TELLE QUE
NOUS L'AVONS REÇUE

THE UNIVERSITY OF ALBERTA

A FOLLOW UP STUDY OF GRADUATES OF AN EXPERIMENTAL PROGRAM IN BUILDING CONSTRUCTION

by

© BRENT TOLMIE

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF EDUCATION

DEPARTMENT OF INDUSTRIAL AND VOCATIONAL EDUCATION

EDMONTON, ALBERTA

FALL, 1979

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND REASEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "A Follow-up Study of Graduates of an Experimental Program in Building Construction," submitted by Brent Tolmie in partial fulfilment of the requirements for the degree of Master of Education.

.....

Supervisor

.....

.....

Date Oct 4, 1979

ABSTRACT

The purpose of the study was to investigate the comparative effectiveness of various stages of development of a building construction program at the Southern Okanagan Secondary School, Oliver, B.C. from 1968 to 1976. A cross-sectional follow up survey of graduates from the program was undertaken. A mailed out questionnaire was designed to obtain the graduates' perceptions on the program, occupational pursuits and degree of preparation for avocational or vocational use of knowledge and skills gained from the program. A causal-comparative research design was chosen and included an inferential statistical treatment of data as well as a descriptive statistical component.

The study was specific in both population and program parameters. The generalizability of the study was therefore somewhat affected. A chi-square test was used to compare group frequencies. The study also provided descriptive statistics on the characteristics of the graduate groups by year and by phases of the program.

It was determined that the graduates from the experimental phases of the program, in which large scale practical projects were constructed, showed a more favourable response toward the program. Further descriptive statistical data indicated that greater numbers of graduates

from the experimental phases of the program either chose an occupation related to building construction or used the skills and knowledge gained from the program in an avocational application.

It was concluded that the introduction of the building construction program had resulted in greater numbers of students for the program, with both vocational and avocational interests, and, in general, the graduates viewed the experimental program as a more effective means of teaching the practical aspects of building construction.

ACKNOWLEDGEMENTS

To my advisor, Dr. M. Petruk, a sincere vote of thanks for providing me with such positive support which made the "tough going" much more palatable than anticipated. Also, to Dr. J. Gallagher, Dr. V. Nyberg and Professor D. Collett, a special thanks for their constructive criticism and sage advice. Special thanks to two concerned and supportive colleagues, K. MacRury and G. Perry. The assistance provided by Dr. K. Puffer and G. Kendal was most appreciated.

And to my wife, Barbara, sons Barry and Derek, an affectionate thank you for their support and understanding.

TABLE OF CONTENTS

Chapter		Page
I	INTRODUCTION	1
	The Problem	1
	Definition of Unique Terms	3
	Objectives of the Study	4
	The Null Hypothesis	5
	Delimitations of the Study	6
	Limitations of the Study	6
	An Overview of the B.C. Industrial Education Program	7
	Brief History of Program Development	10
	Synopsis of the Study	12
II	SOME RELATED RESEARCH	13
	Relevance of Follow-up Studies in Program Evaluation	13
	Related Research Studies	15
	Examples of Similar Research	16
	Summary of Related Research of Similar Studies	20
	Discussion of Methological Designs	20
III	RESEARCH DESIGN AND PROCEDURES	28
	Overview of Research Design	28
	Identification of the Population	30

Chapter		Page
	Research Procedures	32
	Collection of Data	35
	Coding of Questionnaire Data	36
	Analysis	37
	Test of Significance	37
IV	THE RESULTS OF THE STUDY	39
	Presentation of Findings	39
	Characteristics of Respondents	40
	Student Selection Criteria	44
	Perceived Program Effectiveness	48
	Analysis of Occupational Pursuits	59
V	DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS	69
	Introduction and Purpose	69
	Discussion Strategy	69
	Hypothesis Testing	70
	Findings and Conclusions	71
	Suggestions for Further Study	74
	BIBLIOGRAPHY	75
	APPENDIX A - Questionnaire	79
	APPENDIX B - Letter to Sample	88
	APPENDIX C - Respondents' Additional Comments	91

LIST OF TABLES

Table		Page
1	Selection and Location of Graduates	32
2	Data Collecting Statistics	36
3	Program Selection of Graduates by Years	42
4	Major Influence for Selection of Building Construction Program	44
5	Period at Which Building Construction Program was Chosen	47
6	Graduates' Rating of the Building Construction Program	48
7	Response Rates of Graduates on Question: "Would you select this program again if you had the opportunity to do high school over?"	50
8	Assessment of Job Entry Skills (By Years)	52
8a	Assessment of Job Entry Skills (By Phases)	53
9	Avocational Group's Perceived Level of Skill (By Years)	54
9a	Avocational Group's Perceived Level of Skill (By Phases)	54
10	Avocational Group's Perceived Ability to Build Their Own Home	56
11	Proportion of Vocational Group That Took Further Training	57
12	Perceived Degree of Preparation for Further Training	58
13	Relationship of Building Construction Program to Graduates' Present Occupation	61

Table		Page
14	Classification of Occupations of Vocational Group	62
15	Relationship of Building Construction Program to the Job	63
16	Relationship of Practical Aspect of Course (Skills Learned on Project) To Skills Used in Industry	64
17	Classification of Occupations of Avocational Group	65
18	Perceived Relationship Between Building Construction Program and Occupational Choice by Avocational Group	67
19	Perceived Use of Knowledge Gained From Building Construction Course by Avocational Group	68

LIST OF FIGURES

Figure		Page
1	% Returns by Years of Program	41

CHAPTER I

INTRODUCTION

The Problem

Industrial Education evaluation has been given much attention recently in light of the heavy demands for skilled and trade related personnel, as evidenced by studies of projected manpower needs. The impact of technology and the resulting government support for improvement and expansion of Public School programs has brought about new strategies for the preparation of students for employment in these areas. However, much of the relative effectiveness of these programs has been based on speculation and subjective judgement.

Although evaluation of educational programs is a complex process, an important dimension of any process is to evaluate the product of the program--in this case, the students. Sharp and Krasnegor (1966) indicated the importance of follow-up studies on graduates of a program by stating:

> Although this is not the only method of evaluation, those who plan vocational educational policies should have data on employment outcomes on those who have been trained. (p. 6)

They go on further to qualify this position:

> Furthermore, there is need for intensive small scale studies of particular areas, programs and factors. (p. 6)

This study has focussed on a particular program that was instituted into the Industrial Education curriculum at the Southern Okanagan Secondary School in Oliver, British Columbia, Southern Okanagan School District #14, to provide students with practical knowledge and skills in building construction. The study has been limited to the "practical" aspects of the program. This experimental program simulates building construction in a realistic setting by involving students in the actual construction of permanent structures such as cabins, houses, and portable classrooms for use in the school district. The implementations of this program have resulted in increased demands on students, teaching staff, and school administration, and in increased support from the Board of School Trustees. The financial aspects of the program are reflected in the need for specialized equipment and facility renovations.

This program has undergone various stages of development over the past ten years. There is a need, at this time, for a formal research study to assess the effectiveness of the program. The intent of the study is to provide information on the basis of which decisions can be made as to whether continuation of the experimental program is warranted. More specifically, it will provide information on the occupational pursuits of graduates of the program and monitor their perceptions of the program at various stages of development.

Definition of Unique Terms

Building Construction Graduate. For the purpose of this study, those students who successfully completed the construction 12A and 12B courses will be included regardless of whether they were enrolled in the Industrial Academic or combined studies program. High school graduation was not a requirement for inclusion in the study.

Experimental Building Construction Program (Industrial Simulation). This program involves students in the construction of projects utilitarian in nature and large in scope that are directly related to activities undertaken in the building construction industry, such as completing two bedroom homes, and portable classrooms. Modern fabricating techniques are employed and adapted to the high school shop setting.

Follow-up Study. The follow-up study involves designs which require the systematic selection of candidates, and issuance of a questionnaire that will provide data on the individuals' perceptions of the course and their subsequent activities, such as employment status, further training.

Industrial Education. In the British Columbia system, Industrial Education is open to both vocationally oriented students and those who may wish to explore a particular subject area for general interest or avocational goals.

Vocational Group. Those graduates in the sample that have entered occupations that are directly related to the building construction industry.

Avocational Group. Those graduates in the sample that have entered occupations unrelated to the building construction industry.

Traditional Building Construction Program. Although there is no such standard, this term is used to refer to the use of models, fabrication of small components of a building and the more theoretical approach to the teaching of building construction skills.

Objectives of the Study

This following study of graduates of the construction program (Industrial Simulation) will provide answers to a number of questions that are of interest to those involved in the program. In addition, the study will provide input for future programs.

In general, the study will provide data that can assist in: (a) evaluating the effectiveness of the Building Construction Program (Industrial Simulation) with reference to program objectives; (b) comparing the effectiveness of the Building Construction Program (Industrial Simulation) during phases of development; and, (c) providing feedback from former students to assist in making revisions or changes in the program.

Specifically, the study provides answers to the following questions:

1. What were some of the effects of implementing the Experimental Building Program (Industrial Simulation) in the Southern Okanagan Secondary School District #14, British Columbia?

   More specifically,

2. Did the changes in the nature of the experimental building construction program result in: (a) a greater student participation in the course; (b) a greater perceived knowledge and skills for the building construction industry; or, (c) a greater percentage of graduates entering the building construction field?
3. How did the program influence the occupational pursuits or avocational interests of the graduates from the program?
4. In the opinion of students, did the program prepare students for post secondary training at trade, technical and professional levels?

The Null Hypotheses

1. There will be no significant difference in the graduates' reasons for selecting the Building Construction Program when compared by graduation years.

2. There will be no significant difference in the proportions of the groups that pursue occupations that are either related (vocational) or are not related (avocational) to the Building Construction Program.

Delimitations of the Study

1. While the study was specific in nature and was therefore restricted to the graduates of the construction program at the Southern Okanagan Secondary School at Oliver, B.C. between the years 1968 to 1976, there is an aspect of generalizability to other similar programs.

2. The study dealt with the "practical" aspects of the program and did not directly reflect the "theoretical" aspects of the course.

3. During the period of the study, 1968 to 1976, the same instructor conducted the course, so that the techniques used, level of expertise and rapport with students can be assumed to be a rather constant factor (compared to the variations that would result from the use of different instructors).

Limitations of the Study

1. The mobility of former students and the ten-year span of time resulted in the inability to locate some of the subjects and, therefore, resulted in reduced amounts of information.

2. The generalizability of the study was lowered due to the small number of respondents and further reduced because of the inability to locate some individuals.

An Overview of the B.C. Industrial Education Program

In order to comprehend more fully the nature of the B.C. Industrial Education system, a short outline of the pertinent aspects of the program is a necessary adjunct. As in most industrial programs, there have been many changes that have taken place in the B.C. system during the past ten years. The Secondary School Curriculum Guide for Industrial Education (1977) reflects many of these changes and is presented here in a very abbreviated form.

The Industrial Education program in B.C. schools is an integral part of the comprehensive school system and has two main objectives:

1. To provide experience in practical courses as part of general education; and,
2. To provide a preparation for direct entry into employment.

In addition to these two main objectives, the curriculum guide (1977) states that Industrial Education should develop in students:

> (a) an appreciation of the dignity of craftmanship and a pride in a high level of achievement; and,
> (b) the ability to practice correct English, applied mathematics and technical reading. (p. 10.)

The stated goals for Industrial Education are as follows:

1. To develop interests in the technical fields and applied sciences as an integral part of a student's general

education;

2. To develop a foundation of skills and knowledge related to materials and technical procedures;
3. To develop a high degree of safety consciousness;
4. To develop confidence, high standard of performance, and a sense of pride in achievement;
5. To develop creative potential both vocationally and avocationally;
6. To achieve a degree of competency that will assist students to obtain further education, training or employment; and,
7. To develop an insight into the working of the industrial world.

A further statement from the curriculum guide indicates the order of priority in the event that the course is over-subscribed. Inclusion of this information will indicate the spectrum of students for which the course is intended and also indicate the priority that the Department of Education outlines, from the specific training to the general education function of the program. The criteria for entry in the senior Industrial Education courses in order of priority are as follows.

1. If the course is mandatory for the student to meet graduate requirements. (This would give top priority to those students enrolled in Industrial Programs with emphasis on the construction speciality).
2. If the course is desirable as one of the optional courses

to meet graduation requirements. (This would indicate inclusion of students from other programs, provided the course would be an acceptable option.)

3. If the course is requested for general interest or avocational purposes. (This would permit any student to enrol provided that the prerequisite of the grade 9/10 course be successfully completed.)

A recent policy decision by the Ministry of Education requires that all students must take at least one course that provides a "marketable skill". This policy decision will undoubtedly increase the numbers of students that will elect Industrial Education courses for general interest.

The curriculum guide provides some criteria for teachers to assess their courses. Each teacher should assess his or her courses as follows:

> (a) Success of graduates, both in post secondary courses and in finding employment;
> (b) Methods being used in the course as compared to those in modern industry;
> (c) Mastery of course content and confidence displayed by students at the end of the course period. (B.C. Curriculum Guide, p. 16.)

The Industrial Education program, as perceived by the Ministry of Education,

> ...should encourage preparation for a general career in the mechanical construction service or appropriate industries. (B.C. Curriculum Guide, p. 16.)
>
> Most large production plants and buildings are created and operated by a combination of architects, civil, electrical and mechanical engineers. Employees are more likely to be technicians than craftsmen, and all these

> opportunities should be better understood by students who will be entering the work force in the eighties. (B.C. Curriculum Guide, p. 16.)

It is in light of these goals and objectives that the Industrial Simulation aspect of the Construction Program was undertaken. The Curriculum Guide produced by the Ministry of Education is intended to identify "guidelines and learning outcomes for major courses in the program. The development of each course becomes the responsibility of the school operating within district policy."

Brief History of Program Development

In 1967, there was a concern that the Construction Program was not attracting sufficient numbers of students to carry on an effective program. To that point, the traditional approach to the teaching of Building Construction was being used. This approach consisted largely of theoretical assignments, construction of models (small scaled houses, isolated components such as stairs, rafters, windows, etc.) that were torn down afterwards, and individual projects such as furniture, boats and other standard projects.

The low enrollment and under-utilization of the construction facility prompted the Industrial Education Department to embark on a new approach with regard to the practical activities. It was decided to provide a more realistic "hands on" approach by building larger scale, permanent structures. In the 1968 to 1970 period, through

construction of small cabins and storage sheds, the student interest increased to a point where the program showed viability.

In 1971, the first major building construction project was undertaken. A two-bedroom bungalow was constructed at the school and then transported to a site. An agreement was drawn up between a sponsor from the community, the Industrial Education staff, and the school administration. The students were actively involved in all aspects of the projects, which included framing, finishing, plumbing, wiring, foundation construction, cabinet construction, floor installation and so forth.

This experiment proved to be successful, as the sponsors attended a school board meeting to express their gratitude and support for continuation of the program. This resulted in a continuation of the program in the following year.

In the 1973/74 year, the Industrial Education Department approached the administration and School Board for their support. The program reverted back to the traditional approach due to lack of support and the unavailability of a large scale project.

In the following two years the school administration and School Board became actively involved in the support of reinstitution of the experimental program. It was at this time that the Industrial Simulation aspect of the program was fully pursued. The hardships of building full-sized

houses at the school site and then transporting them to a permanent site were overcome in the construction of portable classrooms in cooperation and support of a local manufacturing company. Industrial techniques were adapted to the school shop setting and this allowed students to experience modern fabrication techniques.

Synopsis of the Study

The multifaceted aspect of the Industrial Education program, as outlined in the B.C. Curriculum Guide, with its vocational and avocational intent, its general education versus specific training objective, and the dichotomy between goals that assist students in obtaining further training or in preparing for direct employment create a very complex set of criteria for study. It is therefore intended to use the objectives and goals of the program, as stated in the curriculum guide, to reflect the perceptions of the graduates of the program.

CHAPTER II

SOME RELATED RESEARCH

The literature review that was undertaken to provide information on current studies and relevant research is divided into three tasks: (a) to indicate documented uses of follow-up studies to evaluate vocationally oriented programs; (b) to provide some examples of similar research used in vocational education specifically in Alberta and British Columbia; and, (c) to review some methological designs used in follow-up studies.

Relevance of Follow-up Studies in Program Evaluation

To undertake the evaluation of an educational program, a researcher has many tools available with which to measure the worth or merit of a particular program. The use of the follow-up study of students has gained wide popularity with evaluators in vocationally oriented programs. Cunningham (1967) states: "Traditionally academic subjects and elective courses have a history of acceptance" (p. 27). However, vocational programs have a direct relationship to vocational preparation and therefore:

> The measure of success of vocational education is the extent to which it has enabled students to secure employment and advance on the job as a result of the education received. (Cunningham, p. 27.)

In a study by Sharp and Krasnegor (1966), it was found:

> Follow-up studies were deemed to be useful tools in the evaluation of training and were recommended for further program assessment. (Sharp and Krasnegor, p. 2.)

Smith (1974) suggests that "follow-up of former students and their realm of employment must be multiformed and a continuous activity if it is to hold any promise for constructive service to the instructional programs" (p. 214). Smith further states:

> For the sake of quality growth, every instructional program in the entire garment of vocational education must be modified every year, in some manner. (Smith, p. 215.)

The use of follow-up studies to obtain the observations and reactions of former participants to the learning experiences, as expressed by M. Scriven, as a formative evaluation, can lead to effective program development. Good (1959) submitted that:

> The more analytical school surveys of recent years tell us not only where we are in a particular school system, but also recommend next steps by way of progress and suggests methods of reaching the goals of an improved instructional program. (Good, p. 167.)

However, "decision making must be based on theories and these theories based on valid and acceptable research." (Best, 1959, p. 26.)

Kingsley (1969) considers that follow-up studies can "find congruencies between experiences in training programs

and the role the individual is in or aspires to be in outside." (Kingsley, p. 3.) Data from such studies can provide for meaningful choice; but, "like curriculum evaluation and change, experimentation with methods of instruction should be pursued as a means to an end, not an end in itself" (p. 4).

Change in vocational education programs is inevitable as seen in the rapid technological development. O'Connor (1965) indicates that, "in rapidly changing programs, such as industrial and technical, follow-up studies help programs keep up to changes." (O'Connor, p. 14.) Cunningham (1967) feels that "the findings of detailed follow-up studies have implications for the curriculum, the teacher and the guidance program" (p. 27). It is suggested that this could be enlarged to include school administration, school boards and departments of education.

Related Research Studies

The literature indicates that the follow-up study is a strong technique for determining the effective use of a particular training program. Although it must be realized that it is only one approach, findings from this type of data collection can lead to valid implications of program effectiveness and reflect strengths and weaknesses of the program.

Smith (1974) summarizes this effectively by stating:

> Vocational education, powerfully influenced by so many practices and techniques of business and industry, might well further perfect its emulation of a clear-cut, no nonsense, aggressive follow-up emphasis used in the private sector for instant evaluation (p. 216).

Examples of Similar Research

Although there is a strong support for the follow-up study technique, there is evidence of a lack of its application. Sharp and Krasnegor (1966) indicated that there was a need for more activity in this area, and "furthermore, there is a need for intensive small scale studies of particular areas, programs and factors." (p. 6) There appears to be a preoccupation with large scale studies at the district regional or provincial level. Therefore, most studies are related to general aspects of programs and do not relate to specific features indicated by this study. From a review of the literature it is apparent that few studies are conducted exclusively in the smaller rural areas, and therefore the studies referred to in this research of the literature will not reflect this aspect.

In a 1965 follow-up study of graduates of the Wisconsin Schools of Vocational, Technical and Adult Education, Little and Whinfield attempted to answer three questions:

1. What happened to students who complete the programs;
2. To what extent did the program help students obtain employment; and,

3. To what extent did other factors play a role in obtaining employment?

This study attempted to relate the program to the labour market, but it was cognizant that there were other influential factors and that the program was not the sole contributor to occupational choice and attainment.

A follow-up study of junior college graduates, by Thomas O'Connor in 1965, indicates that success of students can "reflect the success of the institution and has implications for people and programs" (p. 9).

There are many examples of follow-up studies done in the United States, but relevant studies in the Canadian context are more difficult to locate. W.J. Collin (1972) did a follow-up study of 1966-70 graduates of the Alberta Agriculture and Vocational Colleges. The study was structured around a follow-up design in which perceptions of the individual persons in the sample were observed with respect to a number of variables, which required selection of a sample or population, the development of a data gathering instrument, the administration of the instrument, and compilation of the data. Collin did not attempt to compare the graduates from the various years under study, but indicated the strong acceptance of the program as reflected by the graduated perceptions.

Cunningham (1967) administered a follow-up study of vocational education in the province of Alberta. The study was concerned with those students that dropped out of

school and attempted to answer the basic question of: "Where are the graduates and dropouts now?" Cunningham isolated several problems in his study. He determined that "the difficulty of following up students in urban areas was considered more difficult than in small centers" (p. 31). He also could not determine any significant occupational difference between those students who graduated as compared to those who had terminated their formal education before graduation.

The data collection technique used in Cunningham's study was of an indirect approach in that information was obtained by visiting schools and working from class registers. The study showed the need for classification between temporary and permanent employment and effects of fluctuating in the job market. It also indicated that dropout reasons may not reflect the program merits. Finally, the study showed that dropouts had benefitted from the course in that they had gained sufficient skills to find employment in that area.

A similar study was undertaken by E. Leeck (1971) in a follow-up study of high school graduates and dropouts. The major areas of study were on program satisfaction, income satisfaction, and unemployment.

A follow-up study of vocational high school students on apprenticeship programs, by Nielsen (1973), concentrated on trade - motor mechanics. The study reflected the lack of agreement between the Department of Education and the

Apprenticeship Branch, and indicated weaknesses in the accreditation system. It was concluded that closer coordination of the program was necessary. The study also showed that completion of the high school program did not necessarily indicate success in the post secondary level of training.

Penny A. Leman (1970) conducted a follow-up study of students for the Vancouver School Board, entitled An Evaluation of Pre-Employment Program in Secondary Schools of Vancouver, in which she made an assessment of academic performance of pre-employment students as well as opinions of teachers and graduates regarding the effectiveness of the program.

A comparative follow-up study was undertaken by Manning (1971), in which he did a follow-up study on two equated groups--one taking essentially academic subjects and another taking vocational courses. He could not find a significant difference in the occupational choice of these groups as compared to the course selected in high school.

An analysis of the 1972 survey of immediate post secondary activities of grade 12 students in comparison with previous surveys by Leslie (1972), for the Vancouver School Board, compares the post secondary activities from 1966-72 for Vancouver students who were enrolled in grade 12 the preceeding year. This study has particular significance in this review of the literature in that it also collected data from various years of the program and provided a comparative description of these groups.

A final example of similar research was conducted by Bishop (1973), in New Brunswick, where he did a follow-up study of Simonds High School vocational students. This study showed a positive relationship between high school courses and present employment.

Summary of Related Research of Similar Studies

The review of some related research in this area has indicated that there has been considerable activity in the use of follow-up studies, similar to the format of this study, to assess program effectiveness, to make comparisons of various groups of graduates, and to show the relationship of the educational program to employment acquisition and job satisfaction. It would appear that the purpose and strategy of this study can be substantiated on these grounds. This review of similar research indicates some obvious areas of focus that this study will attempt to clarify. Most studies have involved large populations, such as Edmonton, Vancouver, etc. or have been provincial in scope. Many have been multidisciplinary in nature. The unique aspect of this study appears to be its specific nature, both in population and program parameters.

Discussion of Methological Designs

The research enterprise in education is very broad and is comprised of methods borrowed and adapted from other disciplines, such as physics and agriculture. Many experts

in the field of educational research suggest that terms are often not clearly defined and classification of research designs are not mutually exclusive. Often educational research will incorporate several designs in order to meet the objectives of the study. Yates (1971) suggested that:

> It might also prove profitable in planning field studies, to rely on logical influences rather than on elaborate forms of statistical analysis, often ill adapted to the situation encountered in such studies (p. 100).

Much attention has been focussed on the follow-up study as an effective means of gathering data. Yates (1971) states: "Techniques of retrospective interviewing might be used to trace the origin of observed phenomena" (p. 99). Smith (1974) further substantiates this view by expressing that: "Whatever product or service is involved, follow-up techniques have widespread practice" (p. 216). Krasnegor and Sharp (1966) stated that follow-up studies must "...involve research designs which require a contact with individuals who have a shared experience in the past and whom the researcher desires to study or restudy" (p. 8).

In the determination of program evaluation, Krasnegor and Sharp felt that: "The employment of a graduate in a job for which he received training is the accepted ultimate indicator of a successful vocational training" (p.8). They qualify this statement by indicating that the length of employment job satisfaction and other relevant factors must also be considered.

Krasnegor and Sharp consider two types of follow-up

study: (a) Direct contact with individuals to obtain data which may lead to an explanatory function; and, (b) Indirect gathering techniques about individuals through school records, teachers, parents, and employers, which results in a descriptive study.

The instrument used in direct contact follow-up studies is the questionnaire. Much controversy exists as to whether the personal interview or the written form of the questionnaire is more valid. Due to the nature of this study, time lapse mobility of respondents and cost factor, and also despite some negative comments recorded, the written form will be the only method reviewed. A major concern, as expressed by many authorities in the field, is that the mailed out questionnaire yields a generally low return rate. This can alter the outcome of the study, expecially where the numbers of respondents are low. Researchers have suggested techniques to improve the rate of return, but emphasize that the rate of return is an important statistic for the reader of the study.

Carter (1959) comes to the defense of well constructed questionnaires by suggesting that:

> The questionnaire extends the investigator's power and techniques of observation by reminding the respondent of each item, helping insure response to the same item from all respondents andtending to standardize and objectify the observations of different ennumerators. (p. 191.)

Travers counters the previous view by stating:

> Direct mail questionnaires should be avoided unless no other method is available for

> obtaining desired information. Those who return questionnaires delivered through the mail tend to be in the more educated group than those that don't. (p. 220.)

Travers further indicates problems in this form of data collection by cautioning that:

> All surveys that involve a question and answer approach should be considered as studies involving a complex social interaction between questioner and respondent. (Travers, p. 220.)

Finally, Travers outlines one other major concern that the researcher must face.

> There are many difficulties involved in manipulation of conditions in experimental experiments. An error of past generations of the experimental experimentation has been the attempt to manipulate complex conditions such as progressive and traditional approaches to education. (Travers, p. 297.)

Travers felt that "experiments involving such complexities of variables do not generally produce results of value" (p. 297). This rather negative commentary on this research strategy is useful in indicating some of the shortcomings and avoiding the pitfalls of becoming over-confident, when employing this type of research strategy.

Lehman and Mehrens (1971) best describe the overall characteristics of this particular study as an example which they refer to as a casual-comparative research design.

> In the most part, historical research is concerned with "what was", descriptive research with "what is", and correlational research with "what will be". Experimental research attempts to explain "why what really is". (p. 251.)

Johnson lends strength to this classification by

stating: "An experiment can resemble a comparative study. In any experiment, however, a new program can be deliberately introduced and the consequences assessed" (p. 11).

Johnson reflects upon the use of an educational hypothesis and considers it "may refer to a correlation among variables or a difference between groups. An educational hypothesis may be used to give direction to a research study" (p. 198). To lend further support for selection of this technique, Johnson contends: "An argument in favor of the educational experiment is that this kind of study provides the only means for establishing a causal relationship" (Johnson, p. 233).

True experimental research requires the use of a control group. Johnson modifies the definition of a control group for use in the causal-comparative research.

> It would seem that the comparative group in an educational experiment probably serves more as a reference group than as a formal control group (where no treatment is given). The educational experiment usually tries to pick out the better of the two programs. Do students achieve better in the experimental group or the comparison group? (Johnson, p. 235.)

A further qualification of this approach is:

> In the analysis of experimental data through hypothesis testing, differences among students within the experimental group and differences within the comparative group are, of course, assumed to be random differences. (Johnson, p. 232.)

L.R. Gay devotes a considerable amount of his book, Educational Research--Competencies of Analysis and Application,

to classification of the causal-comparative method of research. His definition is stated as:

> ...research in which the researcher attempts to determine the cause, or reason, for existing differences in the behaviour or status of groups of individuals. (Gay, p. 153.)

Gay further delineates the difference between experimental research and causal-comparative research by stating:

> The major difference between them is that in experimental research the independent variable, the alleged cause, is manipulated, and in causal-comparative research it is not, it has already occurred. (p. 154.)

He summarizes this position by suggesting that:

> In causal-comparative research, the groups are already formed and are already different on the independent variable. Causal-comparative groups are already different in that one group may have had an experience which the others did not have, or one group may possess a characteristic which the other group does not. (p. 154.)

Gay also cautions researchers using this strategy.

> Since the independent variable has already occurred, the same kind of controls cannot be exercised as in an experimental study. Extreme caution must be applied in interpreting results. As with a correlational study, only a relationship is established, not necessarily a causal one. The alleged cause of an observed effect may, in fact, be the effect, or there may be a third variable which has caused both the identified cause and effect. (p. 155.)

One further aspect of the literature review of methodology involves the type of follow-up studies. These are generally referred to as the longitudinal or the cross-sectional study. Johnson defines the longitudinal study as "data collected on the same individual's overtime" (p. 280).

Although the general consensus of opinion suggests that this system is superior in providing valuable data for effective predictions, its major fault is that it requires long periods of lead time, considerable initial planning to ensure desirable results, and deference of results which prolongs the remediation of problem areas. Johnson supports the other alternative. The cross-sectional study approach offers a meaningful alternative in that: "A study may appear to be longitudinal, but use several samples of students at different ages or grade groups" (p. 280).

Johnson feels that although maturity factors as well as changes in environmental aspects may be a delimiting factor: "Differences over time reflect differences among pupil samples as well as pupil changes" (p. 280). Johnson further substantiates his position by stating that the "follow back approach is useful in obtaining information on individuals and school programs with far less delay" (p. 280). The choice of the term followback appears to be to emphasize the fact that cross-sectional studies obtain historical data by recall rather than by the use of successive data collection times. Johnson summarizes the purpose of this data collection technique by stating:

> A research report should be judged on the basis of what has been found in a particular school, under specific conditions, and at one time, not whether a new principle that has been established, applies to schools across the nation. (Johnson, p. 448.)

The review of the research proved to be a most informative phase of this study and assisted the researcher in avoiding many pitfalls when constructing the research design. A composite view of the writings of experts in the field and the findings of similar studies provided the researcher with a sound footing from which to move forward.

CHAPTER III

RESEARCH DESIGN AND PROCEDURES

Overview of Research Design

The complex nature of the Industrial Education Program in B.C. with its multifaceted approach in providing a wide spectrum of students with building construction experiences created problems in choosing a research design that would permit the degree of freedom necessary. The causal-comparative research strategy was chosen as it would provide a comparison of groups of graduates, who had experienced different practical approaches to the teaching of building construction. This cross-sectional study used a followback approach which facilitated the collection of data from eight groups of graduates during one data collection period. The most recent graduates used in the study had a three year period from graduation, in order to experience the "world of work". Other groups were required to report their experiences for their first three years after graduation in order to create uniformity.

The graduates were divided into four groups--each depicting a certain stage or activity in the development of the Building Construction Program.

1968-1971	Traditional Approach
1971-1973	House Cst. Program
1973-1974	Revision to Traditional Approach
1974-1976	Industrial Simulation

The comparison between the groups can focus on the perceived value or worth that the graduates placed on the various stages of development of the program.

The design would establish the group of students that participated in the Traditional Building Construction Program (years 1968-1971) as the reference group. (The causal-comparative equivalent of a control group.) There would then be three experimental groups--all having had somewhat different experiences within the program development.

Due to the vocational-avocational emphasis within the Building Construction Program, a further dimension of the study was established. An effort was made to determine the relative worth or value of the program as perceived by the graduates, not only on the basis of occupational pursuits (competence, job satisfaction, promotion), but on the avocational use of the course for those students who did not intend to pursue a career in the building construction industry. Each group was divided into two categories.

1. Those graduates who had at some time been actively employed in a job that is directly related to the building construction industry. (Included in this area would be subtrades, support industries such as hardware salesmen, etc., and orchardists, who use building construction

skills in their work.)

2. Those graduates who had never been employed in a job related to the building construction industry.

The comparison between these groups was attempted in order to determine if the Building Construction Program could effectively satisfy the need of both the vocationally and avocationally oriented students.

Identification of the Population

According to L.R. Gay, "For causal-comparative and experimental studies, a minimum of 15 subjects per group will give some degree of confidence that conclusions reached concerning differences between groups are valid ones" (p. 77). In light of this fact and with the unknown rate of return anticipated, all eligible graduates that met the requirements of having passed the three senior building construction courses were included in the study.

Course	Description
Crt. 11	- Introduction to woodwork machine tools, materials and procedures
Cst. 12A	- House framing, foundation, roofing
Cst. 12B	- Finishing, subtrades

To avoid interference from other programs, students who had transferred into the program from other schools or those who had dropped out of the program or transferred to

another school were included. High school graduation was not a requirement for selection.

All students were included in the study. The names of eligible graduates were collected through a systematic search of the Personal Record cards in the school files. A check was made to ensure that all those identified had met the criterion of successful completions of Cst. 11, Cst. 12A and Cst. 12B courses. A total of 104 graduates met the criterion and are referred to as the eligible group.

Locating addresses was done by phoning parents, contacting graduates directly or by locating friends, relatives, former employers, former teachers, or neighbours. Due to the rural nature of the community with the rather permanent population, indicative of farming communities, locating graduates proved to be a rather rewarding venture. The counselling department at the school and the district counsellor assisted in this search and proved to be most helpful.

This one week campaign resulted in finding addresses for 84 students who are referred to as the accessible group. Special efforts were made to contact graduates from the earlier years of the study, due to the relatively low numbers of participants as a result of lack of course selection, and to their importance to the study, as they were identified as the reference group. After all avenues of pursuit had been exhausted, the mailing list of subjects was established. Table 1 shows the distribution of subjects by phase.

Table 1

Selection and Location of Graduates

	Year Ending	Total Eligible	Total Accessible	% Accessible
Phase I	1969	8	7	87.5
	1970	8	5	62.5
	1971	12	9	75.0
Sub Total Phase I		28	21	75.0
Phase II	1972	14	11	78.5
	1973	14	10	71.4
Sub Total Phase II		28	21	75.0
Phase III	1974	15	13	86.7
Sub Total Phase III		15	13	86.7
Phase IV	1975	17	15	88.2
	1976	16	14	87.5
Sub Total Phase IV		33	29	87.8
TOTAL		104	84	80.7

Research Procedures

Instrumentation: Due to the dispersion of the respondents over a wide geographical area, the direct mailout questionnaire was selected as the only viable means of data collection. The questionnaire design was based on a review of the literature. According to Kerlinger (1972), the format adopted was a composite of the fixed alternative or closed

poll variety, with an open end alternative. A funnelling technique was used in which general questions were posed in the introductory section and more specific questions were presented in subsequent sections.

The questionnaire was divided into three sections:

Section A was answered by all respondents and provided demographic and general information or employment status, etc.

Section B was answered by only those who had been employed at some time in a job related to building construction and posed questions related to vocationally oriented data.

Section C was answered by those who had never worked at a job related to building construction and posed questions that sought avocational implications for the program.

The questionnaire was designed to obtain the following categories of questions:

1. High School program information;
2. Perceived course effectiveness (general);
3. Occupational pursuit and relationship to building construction;
4. Perceived "exploratory function" of the program;
5. Perceived "degree of preparation" for post secondary training;
6. Perceived "general education function" (for avocational

group);

7. Perceived "degree of preparation" for career in building construction cluster;
8. Perceived "degree of realism" of program;
9. Perceived "degree of job satisfaction";
10. Occupational shift;
11. Further educational pursuits.

Research of similar studies proved useful in comparing and contrasting the format and layouts of questionnaires. After several preliminary drafts, the questionnaire was first submitted to a select group of graduate students and professors in the Industrial and Vocational Education Faculty at the University of Alberta. By monitoring their suggestions and criticisms, many weaknesses and shortcomings were identified and eliminated.

The amended edition of the questionnaire was then field tested on four graduates who were not included in the total population of the study but had experienced the program and were familiar with the situation. Their suggestions were mainly in the classification of terms and queries on the format.

The questionnaire was also presented to the principal of the school and to Industrial Education teachers on staff for their constructive criticism.

The final draft of the questionnaire reflected the suggestions of all those consulted.

Collection of Data

The final draft of the questionnaire was mailed out to the subjects on June 4th, 1979, with a covering letter explaining the nature of the study and encouraging the respondents to participate by supplying their candid views. A self-addressed envelope was included.

On June 18, 1979, a follow-up reminder was sent out to all subjects who had failed to return the questionnaire as of June 17th, 1979.

The questionnaires were coded so that each respondent was assigned a two-digit identification number. This identification was used to check off returned questionnaires and to identify those requiring follow up.

A daily tally was kept to record the daily frequency of return. Questionnaires were analysed for completeness. Six duplicate questionnaires were sent out to respondents, who had inadequately answered the section, with further clarifications.

The degree to which addresses were accurately obtained was reflected in the fact that only one questionnaire was returned with an "address unknown" designation. The overall response rate was 69%. Table 2 shows the response rate by phase.

Table 2

Data Collection Statistics

	Year Ending	Mailed Out Questionnaires	Returns	%
Phase I	1969	7	3	60.3
	1970	5	3	60
	1971	9	7	77.7
Sub Total Phase I		21	13	61.9
Phase II	1972	11	7	63.6
	1973	10	9	90
Sub Total Phase II		21	16	76.1
Phase III	1974	13	10	76.9
Sub Total Phase III		13	10	76.9
Phase IV	1975	15	8	53.3
	1976	14	11	78.6
Sub Total Phase IV		29	19	65.5
TOTAL		84	58	69

Coding of Questionnaire Data

Each section of the questionnaire had responses that were numbered and alternative answers that were also numbered. The individual questionnaires which required only one response for each question were then coded into a computer data punching form. This process was repeated for all questionnaires as they were received.

Upon completion of the data coding, the information was then compiled into a computer file for data analysis and treatment.

Analysis

As stated by L.R. Gay, "Analysis of data in causal-comparative studies involves a variety of descriptive and inferential statistics." (Gay, p. 201.) The Chi Square test, which is used to compare group frequencies and, in fact, to see if an event occurs more frequently in one group than another, will be the most frequently used statistical strategy.

L.R. Gay cautions that "there may be a third factor which is the real 'cause' of both the alleged cause (independent variable) and effect (dependent variable)." (Gay, p. 202.) Therefore, the researcher must exercise caution when interpreting the findings.

Test of Significance

Although cross-sectional follow-up studies lend themselves to descriptive analysis, some simple inferential statistical procedures were employed to assist in assessing the probability that the differences between the groups in the study may be due to chance.

When comparing groups in the study, which resulted in relative low numbers of respondents, it was felt that the Chi Square test of significance for independent samples

would best suit this study. G.A. Ferguson defines Chi Square as "the descriptive measure of the magnitude of the discrepancies between the observed and expected frequencies." (1978, p. 189.) The Statistical Package for Social Sciences (S.P.S.S.) computer program was used to calculate the Chi Square values. The X^2 analysis provided by this program makes corrections for small numbers.

Ferguson contends that "if frequencies are 5 or more, good approximations to the exact probabilities are obtained. With certain types of data it is a common practice to combine frequencies." (p. 202)

This test of significance was used to test two major hypotheses that are considered to be the basis for the inferential aspect of this study. In testing these hypotheses, the decision was taken to reject the null hypothesis if the F statistic was significant at the probability level of $\alpha \leq .05$.

In a similar follow-up study, D. Tapscott (1978) suggests that "in the best circumstances null hypothesis testing cannot carry the entire inferential load. When dealing with unruly data supplied by an industrial education survey of this kind, the burden of inductive inference falls even more squarely on the shoulders of the investigator." (p. 35)

CHAPTER IV

THE RESULTS OF THE STUDY

Presentation of Findings

The concise presentation of the findings of this study has posed some problems due to the multi-faceted aspects of the B.C. Industrial Education program and the need to explore the many areas related to this research study. It was decided to present the data in three main categories.

1. Student Selection Criteria. Much information and subsequent insights into the program can be gained from the analysis of the criteria that students use when electing a particular program.

2. Perceived Program Effectiveness. The perceptions, attitudes and "ex post facto" comments that graduates make, regarding their perceptions of aspects of a program that they have gone through, are considered by many authorities as effective monitors of program effectiveness.

3. Analysis of Occupational Pursuits. The analysis of occupational pursuits of graduates, the usefulness of the program as perceived by graduates, as well as other related vocational aspects of the program and the avocational function which provides recreational or non-vocational use of

the program, can reveal important facets of this particular program.

As stated previously, a further dimension of this study is to monitor the vocationally and avocationally oriented respondents on separate criteria. Therefore, a further set of data will be provided for:

1. Vocationally oriented graduates: Those for whom the Building Construction Program provided preparation for employment in a field related to the building construction industry.
2. Avocationally oriented graduates: Those for whom the Building Construction Program provided no direct occupational preparation.

In order to align the groups of graduates with the four phases of development of the program (years in which similar activities were conducted), the eight-year period of investigation will be concentrated into four main phases.

	Years	Type of Activity
Phase I	1969-71	Traditional Approach
Phase II	1971-73	House Projects
Phase III	1973-74	Return to Traditional Approach
Phase IV	1974-76	Industrial Simulation

Characteristics of Respondents

Some data were presented in Table 1 and Table 2 of Chapter III regarding the rate of return. As anticipated, the rate of return from respondents of the earlier years of

study was generally low. This phenomenon has been reflected in many cross-sectional follow-up studies. Figure 1 indicates the percentage of return by graduation year.

The overall rate of return was 69% and the total number of respondents was 58.

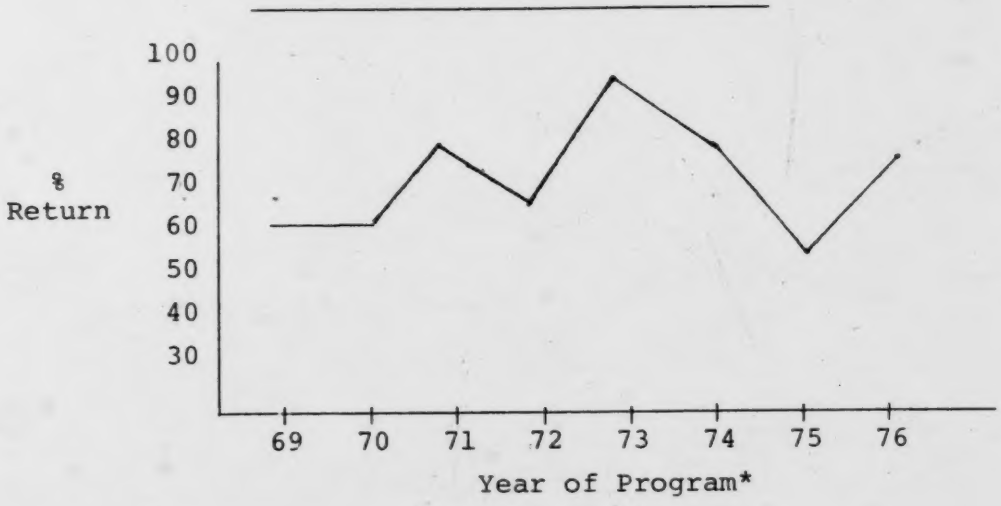


FIGURE 1. % Returns by years of program.
* (By year of completion 1968-76 = 69)

The marked increase in rate of reply, from 1970 to 1971, could possibly have resulted in the knowledge that the 1971 graduates were the first year of the experimental program. This may have created a greater interest in the study and therefore this group may have made a greater effort to submit their questionnaires.

As stated in the overview of the B.C. Industrial Education Program and the multi-faceted approach to meet the needs of a wide spectrum of students, the descriptive data on the types of students (as identified by their

program selections) that selected the Building Construction Program is indicated in Table 3. All percentages reported on all tables are rounded off to nearest whole numbers.

Table 3

Program Selection of Graduates by Years

High School Program	Phase I			Phase II		Phase III	Phase IV		
	1969	1970	1971	1972	1973	1974	1975	1976	
Academic	1 (33%)	1 (33%)	1 (14%)	2 (29%)				1 (10%)	6(10%)
Commercial Combined Studies						1 (10%)	3 (38%)	5 (41%)	9(16%)
Industrial	2 (67%)	2 (67%)	6 (86%)	5 (71%)	9 (100%)	9 (90%)	5 (62%)	5 (45%)	43(74%)
Visual & Performing Arts									
Other									
Total by Year	3	3	7	7	9	10	8	11	58
Total by Phases	13 (22%)			16 (28%)		10 (17%)	19 (33%)		58

This information reveals several trends. As the program developed there appears to have been a general increase in the proportion of Industrial program students. Conversely, the Academic students have dropped in proportion and for several years were not involved in the total program. It

should be pointed out that this sample for the study included only those graduates who took all construction courses. This would not reflect the numbers or trends of those who elected to take only one or two of the courses.

The 1974 year, which appears to be pivotal in many of the tables of data, signified the emergence of the combined studies program (which allows students to elect a mixture of academic, commercial, industrial, etc.). Many students appear to wish a more general or exploratory type of program in order to select a wide range of subjects. Many educators are concerned that this trend may be used as a "way out" whereby a graduate can avoid many of the commitments required by enrolling in a set program and thereby having to meet all the requirements. With the emergence of the requirement that all students take one course that provides "marketable skills," this situation must be monitored carefully. Although freedom of selection is to be encouraged, within the framework of the Department of Education requirements and the schools resources, adherence to the provision of a sound educational training should not be overlooked.

With this overview of the type of students that have responded to the questionnaire, the results of the study are now presented.

Student Selection Criteria

The criteria for selection of the Building Construction Program is a pivotal aspect of this study. Table 4 indicates the graduates stated reason for pursuing the Building Construction Program.

Table 4

Major Reason for Selection
of Building Construction Program

	1969	1970	1971	1972	1973	1974	1975	1976	
For Vocational Interest	1 (33%)		5 (71%)	3 (43%)	7 (78%)	8 (80%)	6 (75%)	4 (36%)	34 (59%)
For General Interest	2 (67%)	2 (67%)	2 (29%)	3 (47%)	2 (22%)	2 (20%)	1 (12½%)	7 (64%)	21 (36%)
For Convenience	1 (33%)								1 (2%)
Other				2 (14%)					2 (7%)
Total by Years	3 (5%)	3 (5%)	7 (12%)	8 (14%)	9 (16%)	10 (17%)	7 (12%)	11 (19%)	58

Test of Significance: Chi Square = 42.95334

df = 21

a = .0032

Table 4 indicates that there is a significant difference in the proportions of graduates' reasons for selecting the Building Construction Program. Although 59% of the total sample

indicated a vocational interest, 36% indicated that they had elected this program for general interest. This study has attempted to compensate for the small frequencies by analyzing data across phases rather than across years. However, in the case of Table 4, it was felt that this variable should be dealt with across years, due to the fact that the reason for selection of the program most likely occurred in the grade 11 year and therefore may not necessarily coincide with the phases. In the year-by-year analysis, several obvious trends occurred. The vocational interest group showed a steady increase from 33% in 1969 to 80% in 1974. However, there is a reversal of this trend in the two following years. The general interest group generally declined until 1976, when there appears to be an increase in this group.

The increase in the general interest group is in agreement with Table 3 which registers a high rate of enrollment from the academic and combined studies programs. The sudden shift in direction of the growth of vocational interest group coincides with the discontinuation of the experimental program and may well reflect the students' reaction to this change. It should be noted that any significant shift will not occur until the second year, as the Building Construction Program is two years in length and students elect one year prior to the year indicated by the study.

A further aspect of student selection criteria was pursued. Table 5 describes the period in which students made the decision to select the program.

In the B.C. Industrial Education system, the eighth, ninth and tenth grades (referred to as junior high school) are considered to be exploratory. The senior years, the eleventh and twelfth grades, are intended to be ones of specialization in areas of high interest. Although it is intended that students are able to make their choice by grade ten, provisions are made to allow students to enter a program during grade 11 and, on occasion, grade 12. However, late entry into a program creates problems for both the students and the delivery system. The "drop-down" syndrome often occurs, whereby a student who fails the Academic Program elects the Building Construction Program as a means of seeking a graduation certificate, and often displays a less committment attitude towards the program.

Early committment may reflect, to some degree, the level of acceptance of the program on the part of the students. The effect of the junior woodworking program would have an effect on this variable as well but is beyond the scope of this study. A third factor that may influence this decision is that the student, if committed to this program, may have selected it early to ensure enrollment due to the restrictive priorities mentioned in Chapter III. Table 5 shows the period during which students chose the Building Construction Program.

Table 5

Period At Which Building Construction Program Was Chosen

	Phase I			Phase II		Phase III	Phase IV		
	1969	1970	1971	1972	1973	1974	1975	1976	
Before Grade 8		1 (33%)	1 (14%)	1 (14%)	2 (22%)		1 (13%)	1 (9%)	7(12%)
During Grade 8	1 (33%)		4 (57%)	1 (14%)	2 (22%)	5 (50%)	1 (13%)	3 (27%)	17(29%)
During Grade 9/10	2 (67%)	1 (33%)	2 (29%)	4 (57%)	2 (22%)	5 (50%)	4 (50%)	3 (23%)	27(40%)
During Grade 11		1 (33%)		1 (14%)	3 (34%)		2 (24%)	3 (27%)	10(17%)
During Grade 12								1 (9%)	1(2%)
	3	3	7	7	9	10	8	11	58

Perusal of this data indicates a similar trend with the 1974 year as the period of shift. In the initial years of the program the trend appears to be toward a lowering of the "moment of decision". The 1974 year indicates the ideal of using grade 8, 9 and 10 as the period of selection. The Phase IV period describes a rather scattered trend. One possible suggestion to explain this phenomenon is that, if the disruption in the program affected the choices of students as suggested in other areas of this study, the selection criteria of students would reflect this fact. The high percentage of grade 11 and 12 students (24% in 1975 and 27% in 1976) would indicate some uncertainty on the part of some

students.

Perceived Program Effectiveness

One clearly defined method of assessing the effectiveness of a program, as outlined in the research of the literature, is to seek the opinions of graduates from the program, regarding their perceptions, *ex post facto*. Table 6 describes the graduates' overall impressions of the course. In subsequent tables and discussions, the more subtle aspects of the perceived program effectiveness will be monitored.

Table 6

Graduates' Rating of the Building Construction Program

	1969	1970	1971	1972	1973	1974	1975	1976	
Barely Satisfactory		1 (37%)	1 (14%)		1 (10%)				3(5%)
Satisfactory		1 (33%)	3 (43%)			1 (74%)	2 (25%)	3 (27%)	10(17%)
Very Satisfactory	2 (67%)	1 (33%)	1 (14%)	4 (57%)	2 (27%)	4 (40%)	1 (13%)	5 (46%)	20(35%)
Excellent	1 (33%)		2 (29%)	3 (43%)	7 (78%)	4 (40%)	5 (62%)	3 (27%)	25(43%)
Total by Years	3 (5%)	3 (5%)	7 (12%)	7 (12%)	10 (17%)	9 (16%)	8 (14%)	11 (19%)	58

By using the four phases of the study, one can establish that the 1970 to 1971 period had 37% and 14% of the group that assigned a barely satisfactory value to the program. The initial years of the experimental program (Phase II) recorded the rating of excellent for 47% and 78% of the respondents. Again, a somewhat downward trend occurred in the 1974 to 1976 period. Only 43% of the respondents recorded an excellent rating for the course, although 0% indicated barely satisfactory.

This heavy weighting towards the positive end of the scale, as described by researchers as the degree of leniency *vs*. the degree of severity attitude inherent in respondents, would indicate that respondents exercised leniency in their approach to the questionnaire. Of the many factors that may be submitted to explain this situation, the association of student and researcher would undoubtedly influence emotionally biased ratings such as these.

Knowledge of this tendency can be used to interpret the data with a view to adjusting this rather negatively skewed data.

A further dimension of rating the course and also, to an extent, monitoring the reliability of the graduates' selections, is a commonly used technique of presenting students with the hypothetical situation of being able to repeat their high school education and finding out if students would still select the same program, having their present insights and knowledge of life as it exists. Table 7 is

divided into three segments so that each group can be monitored and an overall picture also presented.

1. Group A - vocationally oriented students.
2. Group B - avocationally oriented students.
3. A total of Group A and Group B.

Table 7

Response Rates of Graduates on Question:
"Would you select this program again if you had the opportunity to do high school over?"

	1969	1970	1971	1972	1973	1974	1975	1976	
Yes	1 (50%)		1 (100%)	6 (100%)	4 (100%)	1 (100%)	3 (100%)	6 (100%)	22 (96%)
No									
Don't Know	1 (50%)								1 (4%)
	2		1	6	4	1	3	6	23

Group A. Vocationally Oriented Graduates

	1969	1970	1971	1972	1973	1974	1975	1976	
Yes	1 (100%)	3 (100%)	3 (50%)		3 (60%)	8 (89%)	4 (80%)	5	27 (77%)
No			1 (17%)	1 (100%)	2 (40%)	1 (11%)			5 (14%)
Don't Know			2 (33%)				1 (20%)		3 (9%)
	1	3	6	1	5	9	5	5	35

Group B. Avocationally oriented Students

Table 7 (cont'd):

Yes	49 (84%)
No	5 (9%)
Don't Know	4 (7%)
	58

Total Group

Although these tables reflect a rather high level of "confidence of selection" among the total group of graduates (84% stated affirmation of the question), this table does indicate that the vocational group tended to be more positive in their "confidence of selection" (96%) than the avocational group, who recorded 77% "in favour" of selecting the program. A possible cause of the lower rate of "yes" responses to this question from the avocational group is that this group is seeking the building construction course for general education and, therefore, would readily select another program if replicated. It would appear, however, that the high positive response from the avocational group (77%) indicates that the general education function is a very integral part of the program and not simply an adjunct used to fill class numbers.

This table did not provide discrimination between the various stages of the program on the vocational group

and, therefore, no comparison of groups can be undertaken.

The assessment of program effectiveness by the use of a follow-up study of graduates to obtain their perceptions of the program, *ex post facto*, has many facets.

As outlined in the B.C. Curriculum Guide for Industrial Education, these programs should provide students with entry level skills in jobs related to the Building Construction cluster of occupations. Table 8 shows the vocationally oriented groups' reaction to the assessment of their level of knowledge and skills at the entry level of their first job. Table 8(a) is a condensation of these data, as identified by phases of the program.

Table 8

Assessment of Job Entry Skills (By Years)

	1969	1970	1971	1972	1973	1974	1975	1976	
Poor									
Satis-factory	1 (50%)			1 (17%)	3 (75%)	1 (100%)	1 (33%)	2 (33%)	9 (39%)
Good	1 (50%)		1 (100%)	5 (83%)	1 (25%)		2 (67%)	4 (67%)	14 (61%)
Total	2		1	6	4	1	3	6	23

Table 8a

Assessment of Job Entry Level Skills (By Phases)

	Phase I	Phase II	Phase III	Phase IV	
Poor					
Satisfactory	1 (33%)	4 (40%)	1 (100%)	3 (33%)	9 (39%)
Good	2 (67%)	6 (60%)		6 (67%)	14 (61%)
TOTAL	3 (13%)	10 (43%)	1 (4%)	9 (39%)	23

With the exception of 1974, this table indicates that the perceived job entry level of skills was consistent with the average of 61% - good and 39% - satisfactory. The low return rate in 1974, n=1, is an interesting statistic in itself and will be discussed later. However, no significance can be placed on this lone response.

The avocational group (Group B of respondents) were also monitored on their perceived level of skills as a component of the general education function of the course.

Table 9 and 9(a) will deal with respondents' reactions to their perceived levels of skill (a projection of how they feel they could have performed had they gone into the Building Construction Industry).

Table 9

Avocational Group's Perceived Level of Skill (By Years)

	1969	1970	1971	1972	1973	1974	1975	1976	
Not Employable			1 (17%)						1 (3%)
Employable at an Unskilled Level		2 (67%)	2 (33%)	1 (100%)	1 (20%)	5 (56%)	1 (20%)	2 (40%)	14 (40%)
Could Perform Adequately	1 (100%)				3 (60%)	4 (44%)	3 (60%)	3 (60%)	18 (51%)
Don't Know					1 (20%)		1 (20%)		2 (6%)
	1	2	3	1	5	9	5	5	35

Table 9a

Avocational Groups Perceived Level of Skill (By Phase)

	Phase I	Phase II	Phase III	Phase IV	
Not Employable	1 (10%)				1 (3%)
Employable at Unskilled level	4 (40%)	2 (33%)	5 (56%)	3 (30%)	14 (40%)
Could Perform Adequately	5 (50%)	3 (50%)	4 (44%)	6 (60%)	18 (51%)
Dont't Know		1 (17%)		1 (10%)	2 (6%)
	10	6	9	10	35

The avocational group (Group B of respondents) reflected a similar attitude toward their perceived level of skill. Table 9(a) indicates that 50% of the respondents from Phase I and Phase II felt that they could perform adequately while Group IV has a higher percentage of respondents that expressed confidence in their level of skill. The Phase III group of respondents had a lower percentage (44%) of people that were willing to suggest that their skills were adequate, in their estimation.

A possible reason for the lower percentages of graduates that followed building construction from that group (Phase IV) is that the lack of work on a large scale practical project could have influenced their evaluation of their skills. This concept will be further explored and developed in the conclusions.

To analyze further the views of the avocational group with respect to its perceived level of skills, for general education program such as home use of skills and knowledge, this group was asked a question regarding its perceived level of skills with relationship to the construction of a personal residence. Table 10 will provide their responses in phases of development.

Table 10

Avocational Group's Perceived Ability to Build Their Own Home

	Phase I	Phase II	Phase III	Phase IV	
Definitely Not			1 (11%)	1 (10%)	2 (6%)
Maybe but With Much External Advice	4 (40%)		4 (44%)	2 (20%)	10 (28%)
Yes With Some Advice	5 (40%)	6 (100%)	2 (22%)	4 (40%)	17 (49%)
Definitely With Minimal Advice	1 (10%)		2 (22%)	3 (30%)	6 (17%)
Can Not Say					
	10 (29%)	6 (17%)	9 (25%)	10 (29%)	35

Table 10 indicates that the Phase III group appears to have a greater hesitancy to respond positively to this question. 44% indicate that they could "maybe but with much external advice," compared to the more positive reactions of 50% in Phase I and 40% in Phase IV and 100% in Phase II reacting to the "yes, with some advice" response. The uniformity and positive response of Phase II groups can be undoubtedly attributed to the fact that this group had the most direct experience of actually constructing a house. The high rate of 30% who show a very positive attitude in this

respect (Phase IV) may be a reflection of the "exuberance of youth" as this group has probably not confronted the task of building a home after only three years beyond graduation.

Another dimension of perceived program effectiveness is reflected in the program goals for industrial education as: "to achieve a degree of competency that will assist students to obtain further education, training or employment" (B.C. Curriculum Guide, p. 14). The expressed need for a continuation of initial skills and knowledge is reflected in Table 11 which shows the proportions of the vocational group that have taken further training. Of the total of Group I (n=23), 57% of the vocational group took further training. Again, the absence of sizeable numbers in the 1974 year creates difficulty in comparing the groups. The one observation that can be made is that in the 1974 year, no one went for further training--this signifies that the program did not provide any journeymen for the building construction industry in 1974--which is a very significant finding and one that should cause some concern.

Table 11

Proportion of Vocational Group That Took Further Training

	Phase I			Phase II		Phase III	Phase IV		
	1969	1970	1971	1972	1973	1974	1975	1976	
Yes	1 (50%)		1 (100%)	3 (50%)	3 (75%)		1 (33%)	4 (67%)	13 (57%)
No	1 (50%)			3 (50%)	1 (25%)	1 (100%)	2 (67%)	2 (33%)	10 (43%)
Total by Groups	2 (9%)		1 (4%)	6 (26%)	4 (17%)	1 (4%)	3 (13%)	6 (23%)	23
Total by Phases	3 (13%)			10 (43%)		1 (4%)	9 (31%)		27

Another important factor presented in this table is that 43% of the graduates working in a job related to building construction have been able to do so with the training provided by the Industrial Education Program, presumably. This would suggest that the training meets the requirement of providing entry level skills. The 1975 and 1976 years of the program in which 67% and 43% of the students have not received further training indicates that the Industrial Simulation aspect of the program may provide sufficient training for many industries.

A final condition for analysis of those vocational graduates (Group A) that took further training is to obtain data on the worth or merit of the preparation function of the program by determining the degree of assistance the Building Construction Course provided for further training. Table 12 indicates the ratings on a four-point scale.

Table 12

Perceived Degree of Preparation for Further Training

	Phase I			Phase II		III	Phase IV		
	1969	1970	1971	1972	1973	1974	1975	1976	
No Help									
Little Help	1		1	1					3
Some Help				2	3		1	2	8
Great Help								2	2
Total by Year	1		1	3	3		1	4	13
Total by Phase	4			12		-0-	10		26

This table, although it contains small entries, suggests that those students that went on to further training, from the later phases of the course, perceived their degree of preparation to be of a higher level.

Analysis of Occupational Pursuits

In the final aspect Of the study, as Sharp and Krasnegor state (on page 1 of the introduction of this study) the analysis of occupational pursuits is a major factor in the evaluation of any program.

This segment of the study will provide a description of how the graduates of the program have used the training and the degree to which graduates have: felt that the training provided by the program has preapred them for either: (a) a job in the building construction industry; (b) an avocational use of training such as hobby work, home improvement, etc.; (c) a job in an indirect field of application, such as an orchardist, logger, saw mill worker, etc,; or, (d) as a foundation for further training.

The segment of the study will also focus on the exploratory function of the study--its introduction to a realistic view of the building construction industry and its effect on career choice.

Table 13 shows the relationship of the building construction course to the graduates' present position. The information presented here, and Table 13, "Reason for Selection of the Program," will provide the major thrust of

this research paper.

Analysis of Table 13 shows that from the total group the program provided training for the avocational or general interest group (60%) and the vocational or job oriented group (40%). Over the eight years of the study, there has been a gradual downward trend from emphasis on the vocational to avocational oriented students. Whether this trend is a result of the program or an external factor is beyond the scope of this study. However, a visible statistic is the extremely low percentage of graduates that enter a vocation related to building construction in 1974 (10%), which suggests that this trend is a result of the type of program offered--the traditional approach. This can be further substantiated when an analysis is made of Table 4, which shows that 80% of the 1974 group elected the program for vocational interest and only 10% followed into this area of employment.

A further description of the analysis of occupational pursuits is outlined in Table 14, whereby the vocational group is divided into categories within the building construction cluster. It must be noted here that the categories are difficult to delineate clearly as many jobs overlap or are combinations of others. However, an attempt was made to have respondents indicate the category most representative.

Table 13

Relationship of Building Construction Program to Graduates' Present Occupation

	Phase I			Phase II		III	Phase IV		
	1969	1970	1971	1972	1973	1974	1975	1976	
Provided introduction & Prep. Build. Const.	2 (69%)		1 (14%)	6 (86%)	4 (44%)	1 (10%)	3 (37%)	6 (55%)	23 (40%)
No. Prep.	1 (33%)	3 (100%)	6 (86%)	1 (14%)	5 (56%)	9 (90%)	5 (63%)	5 (45%)	35 (60%)
Total by Years	3	3	7	7	9	10	8	11	58
Total by Phases	13 (22%)			16 (28%)		10 (17%)	19 (33%)		58

Test of Significance:

Chi Square by Year = 15.77052

df = 7

a = .0273

Chi Square by Phase = 9.12992

df = 3

a = .0276

Table 14

Classification of Occupations of Vocational Group

	Phase I 1969 1970 1971	Phase II 1972 1973	III 1974	Phase IV 1975 1976	
Residential Construction	2(50%)	4(40%)	1 (100%)	5(63%)	12 (50%)
Heavy Construction					
Production Line	1(25%)	3(30%)			4 (10%)
Mill Work	1(25%)				1 (4%)
Sub Trade				1(13%)	1 (4%)
Other		3(30%)		2(24%)	5 (22%)
Total	4	10	1	8	23

The rather large percentage indicating "other", upon further analysis, was in the sawmill industry, such as, saw filer, lumber grader, etc.

As expected, residential construction was the most important area of employment. After the "other" category already described, the production line activities, such as mobile trailer plants, recreational camper industries, etc., employ 18% of the graduates. This reflects the nature of the local industry and also supports the decision to participate in industrial simulation activities.

The lack of participation in heavy construction also reflects the nature of the community, which does not have much commercial or high rise construction.

A progression from cagegories of occupations pursuits of graduates in building construction is the perceived degree of realism that vocationally-oriented students associate with the Building Construction Program. Table 15 attempts to determine the relationship of building construction to the job.

Table 15

Relationship of Building Construction Program to the Job

	Phase I 1969 1970 1971	Phase II 1972 1973	III 1974	Phase IV 1975 1976	
None					
Little		1 (10%)		1 (12%)	2(9%)
Some	1 (33%)	4 (40%)	1(100%)	4 (44%)	10(43%)
Considerable	2 (67%)	5 (50%)		4 (44%)	(48%)
TOTAL	3	10	1	9	23

This table indicates the relative "degree of learning" expressed in many of the tables. The researcher attempted to use a negatively biased scale from "no", to "little", to "some" and finally "considerable". This information indicates that all groups, with the exception of 1974, found a significant relationship with their jobs.

A final piece of information that is closely related to the previous topic is the relationship of the practical aspect of the Building Construction Program (the type of project) to the practical aspects of the job (skills used on the job). Table 16 indicates the vocational graduates' perceptions of the relationships.

Table 16

Relationship of Practical Aspect of Course (Skills Learned on Project) to Skills Used in Industry

	Phase I			Phase II		Phase III	Phase IV		
	1969	1970	1971	1972	1973	1974	1975	1976	
Totally Realistic									
Little Relationship	1 (50%)				1 (25%)		1 (33%)	1 (17%)	4 (17%)
Very Realistic	1 (50%)		1 (100%)	6 (100%)	3 (75%)	1 (100%)	2 (67%)	5 (83%)	19 (83%)
Total by Year	2		1	6	4	1	3	6	23
Total by Phase	3			10		1	9		23

This table does not discriminate between phases of the program and does not lead to any conclusive evidence that one project is more realistic than others in terms of providing industrial skills.

The occupational pursuits of the avocational group provides information that assists in making this aspect of the program meaningful. Due to the large spectrum of occupations that the avocational students go into, it is difficult to provide data that are general enough in nature. Table 17 is designed to provide these data.

Table 17

Classification of Occupations of Avocational Group

	Phase I			Phase II		Phase III	Phase IV	
	1969	1970	1971	1972	1973	1974	1975 1976	
Technologist Technician		2(20%)						2(6%)
Professional		1(10%)			1(17%)			2(6%)
Trade		4(40%)			2(33%)	5(50%)	1(10%)	12(34%)
Other		3(30%)			3(50%)	4(43%)	9(90%)	19(54%)
Total		10			6	9	10	35

The large category of "other" (54%) required further study. It appears that a large proportion of others are orchardists. This is an oversight on the part of the researcher as this should have been a mutually exclusive category. The general reaction of this group is favourable towards the construction program, in that it provides skills and knowledge necessary for efficient operation of an orchard.

The second largest occupational classification of avocational groups is in the trades (34%). These trades include: electrical installation, refrigeration, automotive, etc. Many of this group have need for the skills and knowledge gained for vocational purposes although for the purpose of this study, they are treated as avocational.

The technologist/technician and professional classifications present only 4% of the avocational group.

There are appreciably more of this classification of graduates involved in the program on a part time basis (do not do all courses) due to the heavy time requirements of the academic programs.

A further set of data, displayed in Table 18, indicates the relationship between the Building Construction Program and occupational choice as perceived by the avocational group. The conclusion that can be drawn from this table indicates that building construction has not only a general interest value to this group, but actually in 49% of the responses has vocationally indirectly related value.

Table 18

Perceived Relationship Between Building Construction Program & Occupational Choice by Avocational Group

	Phase I			Phase II		Phase III	Phase IV		
	1969	1970	1971	1972	1973	1974	1975	1976	
None	1 (100%)		4 (67%)		4 (80%)	4 (44%)	2 (40%)	2 (40%)	17 (49%)
In-direct		3 (100%)	2 (33%)	1 (100%)	1 (20%)	4 (44%)	3 (60%)	3 (60%)	17 (49%)
Direct						1 (12%)			1 (2%)
Total by Group	1	3	6	1	5	9	5	5	35
Total by Phase	10			6		9	10		35

This would appear to reflect the high percentage of trade occupations. The 49% of graduates from the avocational group that signified that the Building Construction Program had no relationship, will be used in interpreting the final table of the chapter.

Table 19 deals with the perceived use of the knowledge gained in the building construction course. Many opponents of the Industrial Education concept of providing students with general education feel that the Building Construction Program should be strictly vocationally oriented and not geared for the wider spectrum of students now served.

However, the avocational graduates indicated that 57% of them consider the knowledge gained from this program "of great use". No respondents classed it "of no use".

Table 19

Perceived Use of Knowledge Gained From Building Construction Course by Avocational Group

	1969	1970	1971	1972	1973	1974	1975	1976	
Of no Use									
Of Indirect Use		2 (67%)	3 (50%)	1 (100%)	2 (40%)	4 (44%)	1 (20%)	2 (40%)	15 (43%)
Of Great Use	1 (100%)	1 (33%)	3 (50%)		3 (60%)	5 (56%)	4 (80%)	3 (60%)	20 (57%)
Total by Years	1	3	6	1	5	9	5	5	35
Total By Phases	10			6		9	10		35

CHAPTER V

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

Introduction and Purpose

This study had three main objectives. There was an investigation to determine whether the introduction of the experimental Building Construction Program resulted in any significant changes in student enrollment, student selection criterion, student occupational pursuits and students' perceptions of the course.

A further aspect of the study was to provide a causal-comparative analysis of the four distinct phases of the development of the program, with the expressed desire of: (a) evaluating the phases in terms of their relative merits or worth; and, (b) establishing a causal explanation for phenomena that arose from the study.

Discussion Strategy

To structure the discussion of the findings of the study, the two hypotheses will be dealt with and then the problem statements will be analyzed and the pertinent data reflected upon.

As outlined, the data will be analyzed from a descriptive and inferential method, depending on the nature of

the data.

Hypothesis Testing

Hypothesis #1. There will be no significant difference in the graduates' reasons for selecting the Building Construction Program when compared by graduation years.

Table 4 examines the major reasons for selecting the Building Construction Program. Chi Square for this table was 42.95334 (df = 21) and α was .0032. Since α observed was less than .05, the null hypothesis was rejected.

Hypothesis #2. There will be no significant difference in the proportions of the groups that pursue occupations that are neither related (vocational) or are not related (avocational) to building construction.

Table 13 examines the relationship between the Building Construction Program and graduates' present occupations. Chi Square for this table was 9.12992 (df = 3) and α was .0276. Since α observed was less than .05, the null hypothesis was rejected.

Therefore, it can be concluded that:

1. There was a significant difference in the graduates' reasons for selecting the Building Construction Program, when compared by graduation years.
2. There was a significant difference in the proportions of the groups that pursued occupations either in:
   (a) an area related to the building construction field

(vocation); or, (b) an area unrelated to the building construction field (avocational).

In light of these two conclusions, a discussion of the problem statements will be undertaken, to establish possible causal-comparative analysis of relationships from the descriptive data.

Findings and Conclusions

It can be summarily concluded that there were significant effects in implementing the Experimental Building Program. The fact that the numbers of students participating in the program increased was a known fact before the study was commenced. However, more subtle aspects of the growth pattern were brought to light. It can be concluded that the experimental program produced more graduates for the construction trades. The number of graduates that chose this program for general or avocational interest also showed a marked increase. A comparative analysis of the phases of the program clearly indicated that the Phase III or 1974 year of the program had significantly fewer graduates that selected careers in the building construction industry. This group also had the highest rate of response "for vocational interest" to the question or reason for selection of building construction programs. In providing causality for this phenomenon, it could be suggested that the lack of practical experience created this rather

noticeable shift. A graduate of that year noted on his questionnaire that:

> The year I took construction 12A & 12B, there was no practical project, to speak of. The theory I received was the only thing that prepared me for pre-apprenticeship carpentry. The class "lucked out" that year because there was no house to build--that was what most took the course for.

In attempting to compare the perceived levels of skills and knowledge in each of the phases. Phase II and Phase IV reflected the most positive reaction. In addition to that, it would appear that Phase II, the house-construction phase, provided the students with the highest overall "degree of confidence" in their level of skills and knowledge.

The avocational group indicated that a high percentage used this skill and knowledge for indirect use in their occupation (49%). An even higher percentage of this group indicated that the training from the program was "of great value" in general (57%). A quote from an avocational graduate from the 1972 class reflects the view of many, by stating:

> Although I have not got a job in construction, the program at S.O.S.S. enabled me to have the experience to fix the older house which I have purchased. Without the construction knowledge, I would not have bought this house, so I would still be renting. I thought I would mention this to give you an idea how much that course helped me, other than just job-wise.

In dealing with the function of the program that prepares graduates for post-secondary training, the perceived

"degree of preparation" of the vocational group indicates that graduates from the Industrial Simulation or Phase IV felt most positive. The small numbers make comparisons between groups meaningless. The total absence of any vocational graduates that took further training as indicated previously, is a significant factor in this observation. the rather low perceived "degree of preparation" for further training in the Phase I also indicates that the traditional approach is of less help in the preparation of vocational graduates.

In conclusion, it would appear that the Experimental Program, Phase II and Phase IV reflected a generally more favorable reaction by graduates. The discontinuity of the Program in 1974 appears to have had a major influence in creating some unusual trends, in occupational pursuits, further training, rating of course and assessment of job entry skills. The comparisons of the Phase III group's reaction to these variables, when compared to Phase II and Phase IV, would suggest that the experimental program, whether house construction or Industrial Simulation, can best meet the needs and expectations of the graduates, whether they are vocationally or avocationally inclined.

Suggestions for Further Study

This study has isolated a number of implications for further study. The researcher would recommend several areas of possible focus.

1. There appears to be a need for more small-scale cross-sectional or longitudinal studies for all high school programs.
2. The continuous follow-up of graduates is necessary to establish data for continuous rational decision making.
3. The collection of data from other sources, such as employers is required to provide additional information for program evaluation.

BIBLIOGRAPHY

Allan, E.C. and D.J. Collett. A Study of High School Program Retention: A Study Of the Grande Prairie Composite High School. Unpublished manuscript, University of Alberta, 1969.

Best, John W. Research in Education. Englewood Cliffs: Prentice Hall, 1959.

Bishop, William J. A Follow-up Study of Simonds High School Vocational Department, Unpublished M. Ed. Thesis, Directory of Educational Studies in Canada, Canadian Educational Association, Toronto, Ontario.

Brown, D. Students Vocational Choices: A Review and a Critique. Boston: Houghton Mifflin Company, 1970.

Burroughs, G.E.R. Design and Analysis in Educational Research. Education Monogram #8, University of Birmingham, 1975.

Campbell, D.T. and J.C. Stanley. Experimental and Quasi-Experimental Designs in Research. Chicago: Rand McNally College Publishing Company, 1963.

Cochran, W.G. and G.M. Cox. Experimental Designs, (2nd Ed.). A Wiley Publication in Applied Statistics, New York: John Wiley and Sons, Inc., 1957.

Collin, W.J. A Follow-up Study of the 1966-70 Graduates of the Alberta Agricultural and Vocational Colleges. Unpublished Masters Thesis, University of Alberta, 1971.

Cunningham, R.H. Vocational Education Follow-up. Province of Albertam 1967.

Dawson, Leo Shirley. A Follow-up Study of High School Shorthand Students. Unpublished Master's Thesis, University of Alberta, 1966.

Edmonton Public School Board, Vocational Education Services. A Follow-up Study of Vocational Students at Three Edmonton Public High Schools (1969). Edmonton: Edmonton Public School Board, 1971.

Ferguson, G.A. Statistical Analysis in Psychology and Education, (3rd Ed.). McGraw Hill Series in Psychology, New York: McGraw-Hill Book Company, 1971.

Gay, L.R. Educational Research Competencies for Analysis and Application. Florida International University. Columbus, Ohio: Charles E. Merrill Publishing Company, 1976.

Good, Carter V. Introduction to Educational Research. London: Appleton-Century-Crofts Ltd., 1959.

Johnson, M.C. A Review of Research Methods in Education. Educational Series, Chicago: Rand McNally Publishing Co., 1977.

Kingsley, Gordon C. The General 5 to 10 Year Follow-up Study, Vol. V, No. II, University of Minnesota, 1969.

Kreutz, N.B. The Realizability of Vocational Plans of Grade 12 Students in Alberta. Unpublished Master's Thesis, University of Alberta, 1968.

Leeck, E.E. A Follow-up Study of High School Graduates and Dropouts. Unpublished Master's Thesis, University of Alberta, 1971.

Lehmans, I.J. and W.A. Mehrens. Educational Research, Readings in Focus. New York: Holt, Rinehart and Winston, Inc., 1971.

Lieberman, B. Contemporary Problems in Statistics. New York: Oxford University Press, 1971.

Little, Ken and Richard Whinfield. Follow-up of 1965 Graduates of Wisconsin Schools of Vocational, Technical and Adult Education. Industrial Relations Research Institute, The University of Wisconsin, 1970.

Mack, Benjamin Josef. A Follow-up Study of the 1967 and 1968 Graduates of the Edmonton Public School Pre-Employment Program. Unpublished Master's Thesis, University of Alberta, 1969.

Manning, W.G. A Follow-up of Students Taking Vocational-Technical Courses in High School. (Report No. 6). Regina, Saskatchewan: School Trustees Association, Research Center, 1971.

Nielson, Hans Krag. A Follow-up Study of Vocational High School Students on Apprenticeship Programs. Unpublished Master's Thesis, University of Alberta, 1973.

O'Connor, Thomas J. Follow-up Studies in Junior Colleges. Washington, D.C.: American Association of Junior Colleges, 1965.

Ottley. Follow-up Study: Gas Graduates and Supervisors. Unpublished Master's Thesis, University of Alberta, 1973.

Parnes, H.S. and A. Kohen. Labor Market Experience of Non-College Youth: A Longitudinal Analysis. In From School to Work: Improving the Transition. A College of Policy Papers Prepared for the National Commission for the United States Government Printing Office, 1976.

Province of British Columbia. Secondary School Curriculum Guide - Industrial Education. Victoria: Ministry of Education, Schools Department, Curriculum Development Branch, 1977.

Reich, C.M. and S. Zeigler. A Follow-up of Special Vocational and Special High School Students. Toronto: Board of Education for the City of Toronto and Board of Education for the Borough of York, 1972.

Scragg, E.S. A Survey of Dropouts from Alberta Schools 1963 to 1968. Unpublished Master's Thesis, University of Alberta, 1968.

Sharp, Laurie and Rebecca Krasgnegor. Use of Follow-up Studies in the Evaluation of Vocational Education. Washington, D.C.: Washington Bureau of Social Sciences Research, 1966.

Small, J.S. and R.G. Stennett. A Follow-up Study of London Students Who Enrolled in a Two-Year Occupation Program in September, 1965. London: The Board of Education for the City of London, Research Department, n.d.

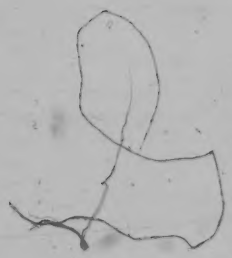
Smith, Wesley P. Philosophy of Quality Vocational Education. M.L. Barlow (Ed.), Washington: American Vocational Association, 1974.

Struening, E.L. and M. Guttentag (Eds.). Handbook of Evaluation Research, 2 Vols. Beverley Hills: Sage Publications, 1975.

Tapscott, Don. A Follow-up Study of Industrial Education Students. Unpublished Master's Thesis, University of Alberta, 1978.

Travers, Robert M. An Introduction to Educational Research, 3rd Edition. New York: The Macmillan Co., 1969.

Yates, Alfred (Ed.). The Role of Research in Educational Change. Institute for Education, Hamburg: Palo Alto, Calif.: Pacific Book Publishers, 1976.



APPENDIX A

Questionnaire

SCHOOL DISTRICT #14 (SOUTH OKANAGAN) CONSTRUCTION PROGRAM
GRADUATE QUESTIONNAIRE.

Do not write your name. For each question place an [x] in the box provided. Please choose the most appropriate response (one per question) unless otherwise stated. For alternative responses please supply additional information in the space provided. Do section A and then either sections B or C.

Section A

1. In which school year did you complete the 12A & 12B course?

☐68/69 ☐69/70 ☐70/71 ☐71/72 ☐72/73 ☐73/74 ☐74/75 ☐75/76

2. What type of practical building construction project did you participate in? (Select only one item)

Traditional approach (individual projects, models, small projects)..... ☐
Small storage shed..... ☐
Bungalow (Two bedroom house)..... ☐
Portable classroom (Industrial simulation)..... ☐
Portable classroom & sauna (Mass production exercise)..... ☐
Other(Please specify) _____ ☐

_____

3. Which high school program were you enrolled in when you left school?

Academic (Arts or Science)..... ☐
Commercial..... ☐
Combined Studies..... ☐
Industrial..... ☐
Visual & Performing Arts..... ☐
Other (Please specify) _____ ☐

4. What other "vocationally oriented" courses did you complete at the grade 11/12 level? (You may check more than one item)

☐Commercial ☐Drafting Surveying
☐Home Economics ☐Electricity - Electronics
☐Band - Choir ☐Mechanics - Metalwork
☐Art ☐Other - Others

If Other -Others please specify _____

_____

5. At what stage did you decide to select the Building Construction Program?

Before entering Junior high school ..... ☐
During grade 8 ..... ☐
During grade 9/10..... ☐
During grade 11..... ☐
During grade 12..... ☐

6. Why did you decide to select this program? (Please check the one you consider most important.)
   - Vocational interest (Exploration for job possibilities)..... ☐
   - General interest (For possible hobby, second interest)..... ☐
   - Necessity (Other options were unavailable)..... ☐
   - Convenience (Commonly referred to as the "easy way out").... ☐
   - Other/Others(Please specify) _____ ☐

7. Did you change your program during your senior years in high school?

   ☐Yes ☐No

   If Yes please specify from _____ to _____
   Name of Program Name of Program

8. How would you rate the Building Construction Course compared with other courses you were enrolled in during high school?
   - A poor program..... ☐
   - A barely satisfactory program..... ☐
   - A satisfactory program..... ☐
   - A very satisfactory program..... ☐
   - An excellent program..... ☐

9. What is your present status with regard to employment?
   - Permanently employed..... ☐
   - Temporarily employed..... ☐
   - Seasonally employed..... ☐
   - Unemployed..... ☐
   - Student..... ☐
   - Other (Please specify) _____ ☐

10. How was your initial job related to building construction? (Select only one item)
    - Directly related (Connected with skills learned in the program)..... ☐
    - Unrelated (In a totally different field)..... ☐
    - Indirectly related (Such as surveying, architectural drafting, building supplies)..... ☐
    - If indirectly related (please specify) _____

11. In your first three years after leaving high school have you been employed in any job related to the construction industry?

    ☐Never ☐(1-3 month) ☐(4 month-1year) ☐1 year -3 years)

    Please specify in years and months _____ years _____ months

12. How would you relate the building construction program you took in high school to your present situation?
    Provided introduction and preparation for occupation in building industry..... ☐
    Provided no occupational preparation..... ☐

FOR THOSE WHO HAVE USED BUILDING CONSTRUCTION SKILLS TO EARN A LIVING ANSWER SECTION B ONLY.	FOR THOSE WHO HAVE NEVER USED BUILDING CONSTRUCTION SKILLS TO EARN A LIVING, ANSWER SECTION C

Section B

For those who have at some time been employed in the building construction industry.

If you are presently unemployed, at a training institution or otherwise not working, please refer to your last related job when answering the following questions.

1. What is the nature of your present employment?
   - Carpentry (Framing, residential construction) ☐
   - Carpentry (Heavy construction) ☐
   - Carpentry (Finishing work) ☐
   - Production line work (Mobile home plants, etc) ☐
   - Millwork, cabinet or furniture manufacture ☐
   - Sub trade (Drywall, cement finishing, floor laying, etc) ☐
   - Other (Please specify) _____ ☐

2. Where is the location of your present residence?
   - Oliver - Osoyoos area ☐
   - Okanagan area other than Oliver - Osoyoos ☐
   - Lower Mainland area ☐
   - Elsewhere in British Columbia ☐
   - Other (Please specify) _____ ☐

3. Did you receive a high school diploma?
   ☐Yes ☐No

4. Do you feel a high school diploma is important?
   ☐Yes ☐No

5. Have you taken any further formal training since you left high school?
   ☐Yes ☐No

6. If having taken further training, what were your reasons? (Check the one you consider to be the most important.
   - Felt high school training was not sufficient ☐
   - For advancement in job ☐
   - Job security ☐
   - Mandatory certification for employment ☐
   - Other (Please specify) _____ ☐
   - Does not apply ☐

7. If you have obtained further training, in what area?
   Trade certification (Journeyman) _____ ☐
   Technical certification (Technical Institute) specify
   _____ ☐
   Professional certification (University) specify _____ ☐
   _____
   Other (Please specify) _____ ☐

8. If you have taken further training, how long after graduation did you enroll?
   Immediately after high school..... ☐
   After short term employment (less than 1 year)..... ☐
   After more than one year..... ☐

9. How did the experience and knowledge gained in high school programs assist you in your initial post secondary program?
   Of no help..... ☐
   Of little help..... ☐
   Of some help..... ☐
   Of great help..... ☐
   Did not take post secondary program..... ☐

10. What was the period of employment for your first job in the building construction field?
   ☐Temporary (1-3 month) ☐Short term (4-6 month) ☐Part-time ☐Regular (6 month-3 years)
   Please specify in _____ years _____ month

11. Which best describes your employment status?
   Same job with same employer..... ☐
   Same job but with different employer..... ☐
   Promoted to new position with new employer..... ☐
   Moved to new position with new employer..... ☐
   Moved from employee to self employment..... ☐
   Other (Please specify) _____ ☐

12. How would you assess your level of satisfaction with your present job?
   Satisfied..... ☐
   Moderate satisfied..... ☐
   Indifferent (Neither satisfied or unsatisfied)..... ☐
   Unsatisfied..... ☐
   Hate my job..... ☐

13. Do you think your involvement in practical work and knowledge gained from building construction courses assisted you in obtaining initial employment?
    - No influence ☐
    - Minimal influence ☐
    - Considerable influence ☐
    - Don't know ☐

14. How would you assess your knowledge and skills gained from the construction program with reference to your first job?
    - Poor (Could not perform tasks expected of me) ☐
    - Satisfactory (Could handle some tasks) ☐
    - Good (Felt confident that I could perform well) ☐

15. Was the practical experience gained from the building construction program a factor in your choice of building construction as a career?
    - No influence ☐
    - Minimal influence ☐
    - Considerable influence ☐

16. How would you relate the practical experience gained in the building construction program to your job in the building industry. (Choose <u>one</u>)
    - No relationship (Did not prepare me) ☐
    - Little relationship (Provided minimal preparation) ☐
    - Some relationship (Provided some preparation) ☐
    - Considerable relationship (Provided satisfactory preparation) ☐

17. Did the experience provided by working on the construction project in the program give you a meaningful insight into the building construction field?
    - Totally unrealistic ☐
    - Provided little relationship ☐
    - Was very realistic ☐

18. If you were to do high school over, would you still select the building construction program?

    ☐Yes ☐No ☐Don't know

THANK YOU FOR TAKING THE TIME TO ANSWER THESE QUESTIONS. THE FOLLOWING SECTION IS OPTIONAL. IF YOU HAVE ANY COMMENTS THAT WOULD ASSIST IN FURTHER CLARIFICATION, PLEASE FEEL FREE TO DO SO.

<u>ANY ADDITIONAL COMMENTS:</u>

Section C

For those not employed in the building industry.

1. Which classification of occupational pursuit listed below are you presently engaged in or are taking training for?

   Technologist or technician (specify) _____ ☐

   Professional (specify) _____ ☐

   Trade (specify) _____ ☐

   Other (specify) _____ ☐

2. What relationship exists between your occupational choice, present training or career, and the experience gained in the construction program?

   ☐ None ☐ Indirect (Surveying, drafting, Real Estate Sales) ☐ Direct (Building technician Engineer, etc.)

3. What use of knowledge gained in the building construction program have you used since leaving high school? (Choose one)

   ☐ No use ☐ Some use (Minor repairs, home projects) ☐ Of great use (Large projects, hobby)

4. How to you rate the building construction courses that you took? (Choose one only)

   Of no value to me..... ☐
   Of little value to me..... ☐
   Of some value to me..... ☐
   Of great value to me..... ☐

5. Did the industrial simulation (experience of working on a group project) assist you in preparation for your career? (eg. attitudes, committment, working with others) Select one.

   Of no help..... ☐
   Of some help..... ☐
   Of great help..... ☐

6. Despite the fact that you didn't select building construction as a career, did the construction program help you to make your career choice? (choose one)

   No help..... ☐
   Made me decide against building construction as a career... ☐
   Encouraged me to follow a trade outside the building construction industry..... ☐
   Encouraged me to follow a related area..... ☐
   Other (Please specify) _____ ☐

7. If you were to do high school over, would you still have selected the building construction courses?

☐ Yes ☐ No ☐ Don't know

8. How would you assess your level of satisfaction with your present job? (Choose one)

Satisfied..... ☐
Moderately satisfied..... ☐
Dissatisfied..... ☐

9. Have you been unemployed in the past three years?

☐ Temporary (0-1 month) ☐ Short term (2-3 month) ☐ Long term (over 4 month)

Please specify in _____ month and _____ years

10. Do you feel that the experience on construction projects were realistic and gave you an adequate insight into the construction industry? (Choose one)

Was not realistic..... ☐
Provided little relationship..... ☐
Was very realistic..... ☐

11. If you wished to, do you feel that you could obtain gainful employment in the building construction field,(in an area related to the training received in the construction program? (Select the response that would best describe your level of skill).

Not employable in the building construction field..... ☐
Employable but at an unskilled level..... ☐
Could perform adequately..... ☐
Don't know..... ☐

12. Do you feel that you would gave gained enough experience from the building construction course, to build your own house? (Choose one)

Definitely not..... ☐
Maybe, with much external advice..... ☐
Yes, but would need some advice..... ☐
Definitely, with minimal help..... ☐
Could not say..... ☐

THANK YOU FOR TAKING THE TIME TO ANSWER THESE QUESTIONS. THE FOLLOWING COMMENTS ARE OPTIONAL. IF YOU HAVE ANY COMMENTS THAT YOU WOULD LIKE TO ADD THAT WOULD ASSIST IN FURTHER CLARIFICATION, PLEASE FEEL FREE TO DO SO.

ADDITIONAL COMMENTS:

APPENDIX B

Letter to Sample

Brent Tolmie,
426 Michener Park,
Edmonton, Alta.,T6H 4M5
June, 3, 1979,

Dear
To receive a letter from me will no doubt be a surprise to you. I imagine your thoughts of high school memories have long faded. I would like to encourage you to reflect for a few moments on a particular aspect of your high school career - the construction program which included construction 11, 12A, and 12B courses. I am presently attending the University of Alberta and as part of my course requirements, I am conducting a followup study of graduates from the construction program at S.O.S.S.

As you are most likely aware, in 1968 the Industrial Education Department embarked on a program to attempt to provide students with more realistic experiences in the building industry. During the following ten year period a number of changes have taken place. We wish to obtain your candid views regarding the program. To obtain an evaluation , I am sending a questionnaire to a random selection of graduates from 1968 to 1976.

You have been selected to participate in this study and is hoped that you will take time out of your busy schedule to answer the the questionnaire. To help you to answer quickly the majority of questions will require only an X beside your choice. Please read the instructions carefully and do Section A and either Section B or C, depending on whether you have followed the construction industry as a career or not.

This questionnaire is identified by a number only (do not put your name on it) so that we can send reminders to those who do not respond to our original requests. Responses will be treated in the strictest confidence.

Due to the fact that we are not requesting all graduates to participate in the study, it is greatly appreciated if you would take the time to complete the questionnaire promptly and return it to me, in self addressed ,stamped envelope I have enclosed.Due to the fact that many graduates cannot be located, your response is greatly needed to make the study as representative as possible.

To compound the problem further, we are planning to move back to Oliver on July 1st. and therefore will be leaving our Edmonton address.I therefore hope to receive your reply as soon as possible.

Thank you for your cooperation and I wish you continued success in your future endeavours.

Sincerely Yours,

Brent Johnnie

APPENDIX C

Respondents' Additional Comments

1970-71

I feel that the Grade 12 course was good for me, but I also feel that it could be better in some ways.

Because of the construction courses I took in school, I believe I will one day have the confidence to design & building my own home.

As I had worked in cst. for over four years since pre-apprenticeship training, I was unhappy with how the union was run. The threat of strikes--not knowing if you will be working next week. I am now an R.C.M.P.

1971-72

Although I have not got a job in construction, the program I took at S.O.S.S. enabled me to have the experience to fix the older home which I have purchased. Without the construction knowledge, I would not have bought this house so I would still be renting. I thought I would mention this to give you an idea how much that course has helped me, other than just job-wise.

I took this course to enable me to construct buildings in a ranch related field, and I feel this course has fully enabled me to do so.

The reason I would not take construction program is because if I had to go through school again, I would work harder and try an academic program. I wasted 1½ years of college picking up math and physics for an academic standing.

High school construction helped more for preparation. Didn't really need post-secondary or 1st year school in apprenticeship.

1972-73

The five years of construction I took were good experience for me (see) Gong Shannores for more.

Although I never went into the construction field for employment, the course was very helpful because it gave me the knowledge to do small projects or major projects on my own. I really don't consult anyone about the projects for help. All in all I think the course was very helpful and worthwhile taking.

I feel the construction course was most valuable, it's the only one I never skipped. Seriously, I would recommend the course to anyone. People that didn't take it wished they did.

1973-74

The year I took Cst. 12A & 12B there was no practical project, to speak of. The theory I received was the only thing that prepared me for a pre-apprenticeship carpentry. The class lucked out that year because there were no house classes to build--that was what most took the course for.

In 1972 I built my first home. Sold it in 1978. Now I'm in the completing stages of my second home.

It would be a great value if a student could obtain on-the-job site experience while attending the construction program.

Course should teach more practical knowledge ways of doing things--less theory, more on-the-job type training.

1974-75

An orchardist must be able to do a lot of different jobs to save money.

If I had the tools I had at school I would be more confident (to build my own house) but at least we still have our notes.

That classes be doubled. It would seem that classes were always too short.

The 12A, 12B construction course was the most enjoyable and practical course I took at S.O.S.S. It has helped me in remodeling my house, building work sheds, garage, etc. And I am planning to build my own house (avocational f.f.).

I helped me to learn how to work with other men. It also helped me to take responsibility on my own.

Prior to taking the construction course I had had previous experience in the building trade. But I found that the combination of classroom, and practical on the site training, gave me a wealth of knowledge, which I had never expected from a high school course. Knowledge which I could put to immediate use.

1975-76

I feel that it is very difficult for people to learn as much as possible in the construction course because of the quantity of people.

I am not building houses, so it is difficult to say that the course was as much of an asset to me right now.

I have to build things once in a while but mostly the farming I do has to do with fruit.

In perfect honesty, I can say that the course you were teaching was my favorite due to your approach in dealing with me personally and on a one to one basis, as well as on an overall teacher student-body basis.